REMARKS

By this amendment, claims 3 and 20 have been amended in the application. Currently, claims 3-5, 7, 9, 10, 12, 14-15 and 20-22 are pending in the application.

Claims 3-5, 7, 9-10, 12, 14-15 and 20-22 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. (JP 1-242782). Also, claims 3-5, 7, 9-10, 12, 14-15 and 20-22 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. in view of Kaneyoshi (U.S. Patent Application Publication No. 2001-0055685). Also, claims 3-5, 7, 9-10, 12, 14-15 and 20-22 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. or Kawakami et al. in view of Kaneyoshi and further in view of Svendsen et al. (U.S. Patent No. 5,262,718). Further, claims 3-5, 7, 9-10, 12, 14-15 and 20-22 were rejected under 35 USC 103(a) as being obvious over Kawakami et al. or Kawakami et al. in view of Kaneyoshi or over Kawakami et al. in view of Svendsen et al. or Kawakami et al. in view of Kaneyoshi, further in view of Svendsen et al., and further in view of Weber et al. (U.S. Patent No. 6,274,241). Further, claims 3-5, 7, 9-10, 12, 14-15 and 20-22 were rejected under 35 USC 103(a) as being

obvious over the cited prior art as applied above and further in view of Segawa et al. (JP 2001-316834).

These rejections are respectfully traversed in view of the enclosed Declaration under 37 CFR 1.132 showing the differences with the prior art to Kawakami et al., the amendments to the claims and the remarks below.

The present invention relates to a conductive electroless plated powder and a method for making the same. More particularly, the present invention relates to a conductive electroless plated powder including core particles and a nickel film provided on each core particle, the nickel film having improved adhesion with the core particle (see page 1, lines 8-13 of the specification).

In the nickel film formed on the surface of the core particle, crystal grain boundaries are not recognized in the cross section in the direction of the thickness of the nickel film, i.e., perpendicularly to the surface of the core particle as shown in Fig. 1 (see page 5, lines 11-15 of the specification).

In the nickel film in which crystal grain boundaries are not recognized as shown in Fig. 1, unexpected results have been found

which include that the adhesion between the nickel film and the surface of the core particle is remarkably high. The film becomes dense and homogeneous, resulting in an increase in adhesion between the nickel film and the surface of the core particle (see page 6, lines 1-9 of the specification).

The method for making the plated powder mainly includes a catalyzation step (1), an initial thin film formation step (2), and an electroless plating step (3). In the catalyzation step, the core particles which have a noble metal ion-capturing ability or to which a noble metal ion-capturing ability is imparted by surface treatment are allowed to capture noble metal ions, and then the noble metal ions are reduced so that the surfaces of the core particles support the noble metal. In the initial thin film formation step (2), the core particles supporting the noble metal are dispersed in an initial thin film-forming solution containing nickel ions, a reducing agent, and complexing agent composed of an organic carboxylic acid or a salt thereof so that nickel ions are reduced to form initial thin nickel film on the surfaces of the core particles. In the electroless plating step (3), a nickel ion-containing solution containing the complexing agent and a reducing agent-containing solution are individually and

simultaneously added to an aqueous suspension containing the core particles provided with the nickel initial thin film and the complexing agent to carry out electroless plating (see page 10, line 13 - page 11, line 10 of the specification).

By this amendment, independent claim 3 has been amended to recite the steps of "(II) adding a slurry, which includes the core particles prepared by said step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an organic carboxylic acid or a salt thereof to prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and reducing the nickel ions to form a uniform nickel initial thin film on the surface of the core particles and smoothing the surface of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a

direction of a thickness of the nickel film on the surface of the core particles".

Similarly, independent claim 20 has been amended to recite the steps of "(II) adding a slurry, which includes the core particles prepared by said step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing 1) nickel ions, 2) a reducing agent including one of sodium hypohosphite, sodium borohydride, potassium borohydride, dimethylamine borane, hydrazine and formalin, and 3) a complexing agent comprising an organic carboxylic acid or a salt thereof to prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and wherein said step of dispersing the core particles in the aqueous medium includes adjusting the reducing agent in the initial thin film-forming solution in the range between 4×10^{-4} and 2.0 mol/l so that the nickel ions are reduced to form a uniform initial thin nickel film on a surface of each of the core particles and smoothing the surface of core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles

having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a direction of a thickness of the nickel film on the surface of the core particles". These features are not shown or suggested by Kawakami et al., Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al. or any combination of these references.

Kawakami et al. relate to an electroless plated powder and a production process therefore (see page 1, lines 14-15 of the translation).

Kawakami et al. also disclose the step of adding at least two solutions constituting the electroless plating solution individually and simultaneously to the aqueous suspension to perform an electroless plating (see page 18, line 23 - page 19, line 6 of the translation).

Kawakami et al. also disclose the concentration of each agent can be set within the saturation concentration and is not particularly limited. However, since low concentration is not economical, the lower limit is naturally limited from the practical point of view (see page 20, lines 1-5 of the translation).

Kawakami et al. also disclose that by adding the plating solution, plating reaction starts promptly. If the individual agents are added at the proper ratio all of the metal salt added is reduced and deposited on the surface of the core material. Consequently, the thickness of the plating film can be controlled arbitrarily depending on the amount of addition (page 21, lines 7-12 of the translation).

Kawakami et al. do not disclose the steps of (II) adding a slurry, which includes the core particles prepared by the step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an organic carboxylic acid or a salt thereof to prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and reducing the nickel ions to form a uniform nickel initial thin film on the surface of the core particles and smoothing the surface of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core

particles having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a direction of a thickness of the nickel film on the surface of the core particles as claimed in independent claim 3.

Kawakami et al. also do not disclose the steps of (II) adding a slurry, which includes the core particles prepared by the step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing 1) nickel ions, 2) a reducing agent including one of sodium hypohosphite, sodium borohydride, potassium borohydride, dimethylamine borane, hydrazine and formalin, and 3) a complexing agent comprising an organic carboxylic acid or a salt thereof to prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and wherein the step of dispersing the core particles in the aqueous medium includes adjusting the reducing agent in the initial thin film-forming solution in the range between 4×10^{-4} and 2.0 mol/l so that the nickel ions are reduced to form a uniform initial thin nickel film on a surface of each of the core particles and smoothing the surface of core

particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a direction of a thickness of the nickel film on the surface of the core particles as claimed in independent claim 20.

Applicants note that in the office action, the Examiner admitted that Kawakami et al. failed to teach that one more plated nickel layer is applied over the plated nickel layer. However, the Examiner believed that it was a well-know principle to reapply a coating composition to achieve a desired thickness of a final coating depending on the intended use of the final coated product.

Applicants respectfully submit that the Declaration under 1.132 submitted with this amendment proves that even though the method of second step (electroless plating treatment) in Kawakami

et al. was repeated after the first step (catalyzing treatment) and the second step (electroless plating treatment) of Kawakami et al. as the Examiner discussed in the office action, grainless boundaries in a nickel film of electroless nickel plated powder were not observed as shown in Fig. 1 of the SEM picture attached with the declaration.

Fig. 1 of the SEM picture in the declaration shows the upper nickel film layer and the lower nickel film layer. The upper nickel film layer and the lower nickel film layer have different colors as shown in the picture. The lower nickel film layer was produced by the first electroless plating treatment. The upper nickel film layer was produced by the second electroless plating treatment.

As a result of this experiment, grainless boundaries in a nickel film of electroless nickel plated powder were not observed when the second step of Kawakami et al. was repeated over the first plated nickel film layer.

On the other hand, the method of the present invention has the initial thin film formation step (the claimed step II) for uniformly and smoothly forming an initial thin nickel film, and the electroless plating step (the claimed step III) for

performing electroless plating because the present invention intends to make a homogeneous and continuous nickel film including grainless boundaries in a nickel film (not controlling the desired thickness of the final coating as discussed by the Examiner).

In the office action mailed on August 15, 2008, the Examiner stated that in the Declaration under 37 CFR 1.132 filed on July 9, 2008, it was not clear why applicants did not follow the method of Kawakami et al. as described in the working examples and obtained a nickel film when Kawakami et al. taught that a nickel film was formed using a plating solution wherein the mixing ratio of the nickel salt and alkali borohydride should vary from 1:1.5 to 2.5 (see translation, page 19, last paragraph and table 3) (see page 8 of the office action mailed on August 15, 2008).

However, applicants respectfully submit that the Examiner is wrong about this point because applicants exactly followed the method discussed in examples 1 to 10 of Kawakami et al. in Experiment 1 of the Declaration under 37 CFR 1.132 filed on October 26, 2007. In this method, the molar ratio of the

solution a (Nickel sulfate) and the solution b (Sodium hypophosphite) is 1:2.5 (see Table 5 on page 25 of translation).

The Examiner choose the plating solution wherein the mixing ratio of the nickel salt and alkali borohydride should vary from 1:1.5 to 2.5. However, this is only one of the examples as shown in Table 3. In the declaration submitted with this amendment, applicants followed the method described in examples 1 to 10 of Kawakami et al. so that a plating solution contains the mixing ratio of the nickel salt and sodium hypophosphite between 1:2 to 3 as shown in Table 3.

Also, applicants respectfully submit that the second nickel film layer produced by experiment 1 of the declaration was just random pieces of nickel powder that were over the random located first nickel powder particles. In Fig. 2 of the SEM picture in the declaration attached with this amendment, the top view of the nickel film of the electroless nickel plated powder obtained in Experiment 1 shows rough surface of the nickel film.

On the other hand, in Fig. 3 of the SEM picture in the declaration attached with this amendment, the top view of the nickel film of the electroless nickel plated powder obtained in the present invention shows a smooth surface of the nickel film

because the nickel film of the plated powder of the present invention is dense, homogeneous, and continuous film. In the nickel film having the claimed grainless boundaries, unexpected results have been found which include that the adhesion between the nickel film and the surface of the core particle is remarkably high.

For these reasons, it is believed that Kawakami et al. do not show or suggest the present claimed features of the present invention. Applicants also submit that Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al. do not make up for the deficiencies in Kawakami et al.

Since Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al. are the secondary references in the rejections and these references do not show or suggest the presently claimed invention.

Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al. do not disclose the steps of (II) adding a slurry, which includes the core particles prepared by the step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing nickel ions, a reducing agent, and a complexing agent comprising an organic carboxylic acid or a salt thereof to

prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and reducing the nickel ions to form a uniform nickel initial thin film on the surface of the core particles and smoothing the surface of the core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a direction of a thickness of the nickel film on the surface of the core particles as claimed in independent claim 3.

Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al. also do not disclose the steps of (II) adding a slurry, which includes the core particles prepared by the step of (I), to an aqueous medium comprising an initial thin-film-forming solution containing 1) nickel ions, 2) a reducing agent including one of sodium hypohosphite, sodium borohydride, potassium borohydride,

dimethylamine borane, hydrazine and formalin, and 3) a complexing agent comprising an organic carboxylic acid or a salt thereof to prepare an aqueous suspension, dispersing the core particles in the initial thin film-forming solution, and wherein the step of dispersing the core particles in the aqueous medium includes adjusting the reducing agent in the initial thin film-forming solution in the range between 4×10^{-4} and 2.0 mol/l so that the nickel ions are reduced to form a uniform initial thin nickel film on a surface of each of the core particles and smoothing the surface of core particles; and (III) adding a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent-containing solution, to the aqueous suspension individually and simultaneously, the aqueous suspension containing the core particles having the initial thin film on the surface thereof so as to perform electroless plating and recognizing a homogeneous and continuous nickel film including grainless boundaries in cross section in a direction of a thickness of the nickel film on the surface of the core particles as claimed in independent claim 20.

It is therefore respectfully submitted that Kawakami et al., Kaneyoshi, Svendsen et al., Weber et al. and Segawa et al., individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

In view of foregoing remarks, it is respectfully submitted that the application is in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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